EVIDENCE-BASED DESIGN FOR PROJECT-BASED LEARNING: A CASE STUDY FOR A 50,000 SF ADDITION DEDICATED TO THE NEW TECH CURRICULUM

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STUDIO JAED
ARCHITECTS • ENGINEERS • FACILITIES SOLUTIONS

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AGENDA

What is Project Based Learning?

What is New Tech?

The New Tech Experience

Group Exercise

Our Planning Process

The Results

Your Ideas Revisited

Q & A
AGENDA

What is Project Based Learning?

What is New Tech?
Project Based Learning (PBL) is an instructional approach built upon authentic learning activities that engage student interest and motivation. These activities are designed to answer a question or solve a problem and generally reflect the types of learning and work people do in the everyday world outside the classroom.
What is New Tech?
They Say...

BLOW IT UP!

- Teacher centered ➔ Student centered
- Working alone on short, simple tasks ➔ Working in teams on long, complex tasks
- Accountable to teacher ➔ Accountable to peers
- Passive learning ➔ Active learning
- Static Information ➔ Dynamic information
DEVELOPED BY BUSINESS LEADERS

- New Tech was started by community and business leaders

- It was designed to mirror the workplace through the use of real-world projects, relevant technology, and professional interactions
DESIGN PRINCIPLES

Technology is not optional; it's as essential as water
  • It does not replace good instruction, it amplifies it

21st Century skills are essential for success in college, world of work, and life
  • Critical thinking, communications, collaboration, etc.

Learning requires engagement and relevancy
  • Connect learning to real life contexts
  • Everyone learns based on a personal "Need to Know"
  • Internships connect content to the real world
MORE DESIGN PRINCIPLES

Students do not all learn the same way or at the same pace

There's more than one right answer to a problem

Students need direct experience with "next steps"
  • College courses on campus
  • Business and community leaders on campus
EVEN MORE DESIGN PRINCIPLES

Relationships matter
- Every teacher must know every kid's name

Environment matters
- Flexible, open spaces facilitate communication and collaboration

Teachers must be curriculum designers
- Facilitates customization to student needs
- Keeps teachers engaged

What gets measured is what gets done
- Content mastery/state standards
- Embedded 21st Century skills
What is New Tech?

The New Tech Experience

Group Exercise
Three Qualities of an Effective School Facility
PROFICIENCY

Facility is functionally flexible, functionally proximate, structurally adaptable, instructionally supporative

ADEQUACY

Facility is safe & secure, accessible, meets codes and regulations, minimum thermal, acoustic, and lighting requirements
sustainable, healthy, high-performance teaching tool.

PROFICIENCY

Facility is functionally flexible, functionally proximate, structurally adaptable, instructionally supporative

ADEQUACY

Facility is safe & secure, accessible, meets codes and regulations, minimum thermal, acoustic, and lighting requirements
EXEMPLARY
Facility is a visionary, motivational, sustainable, healthy, high-performance teaching tool.

PROFICIENCY
Facility is functionally flexible, functionally proximate, structurally adaptable, instructionally supporative

ADEQUACY
Facility is safe & secure, accessible, meets codes and regulations, minimum thermal, acoustic, and lighting requirements
Group Exercise
LEARNING SPACE MATTERS!

WHAT DID YOU COME UP WITH
Given

- What you know about PBL
- What you know about New Tech...
Break out into groups of 3 - 5...
...to discuss what building attributes might be found in a New Tech high school to support their curriculum that might not be found in a traditional high school
LEARNING SPACE MATTERS!

WHAT DID YOU COME UP WITH?
Group Exercise

Our Planning Process

The Results
Delaware New Tech Academy
We began by doing our homework to find out everything we could about PBL and New Tech

- Researched PBL
- Researched New Tech
- Visited Columbus Signature Academy
  - Talked with the principal, students, lead architect, and educational planner
Conducted Two Charrettes

• Visioning Charrette
• Concept Design Charrette
NEED TO KNOWS

Spatial Requirements – How many units/rooms? Capacity of unit/room? Area of unit/room?

Activities – What is going on in the space? How is it used educationally?

Space Relationship – Necessary adjacencies (i.e. administration and guidance; science lab and prep. room and chemical storage room).


Environmental Requirements – Lighting, ventilation, acoustics, window treatments.


Technology – Wired? Wireless? Both? Audiovisual needs (interactive media, flat panel monitors, etc.). Telephone, intercom, sound enhancement, equipment (DVD, document camera, switcher, etc.), clock. Locations?

Surface Material Requirements – Floor, ceiling, walls. Tack Boards, white boards, etc.

General Considerations – Any general characteristics about the space including such items as transparency, flexibility, ambience/style (i.e. professional/business appearance), etc.

Special Characteristics – Any unique aspect of the space. This may include such things as moveable walls between rooms, raised floor, and even items on the outside of the space such as a green roof.
Resulting In
**DELAWARE NEW TECH ACADEMY**

**OVERVIEW**

Delaware New Tech Academy offers students a new kind of high school education. As a "school within a school" at Seaford High School, it gives students a comprehensive academic program featuring Project-Based Learning and daily use of computers and technology in the classroom.

Designed to mimic a modern business, the Academy requires students to learn and complete projects in a way that prepares them for college and the workplace.

The New Tech High School model has been proven successful at more than 60 public schools across the nation. It is not a technical or vocational program, but an academic program that teaches 21st Century skills and prepares students for both college and career.

With the New Tech Academy approach, students work in teams on real-world projects in addition to listening to lectures and using textbooks. As they progress through their projects - some of which come from businesses or institutions in the community - they are taught all the academic content and skills appropriate to their grade level. Then they apply what they have learned to the challenges of their project.

### Area A: Integrated Studio

**Spatial Requirements**
- Number of units: 3 (1 of which is fully ADA accessible)
- Unit capacity: 50 Students, 2 Facilitators
- Unit area: 1,600 SF recommended

**Activities**
- Direct instruction
- Individual work
- Small & whole group presentations

**Space Relationships**
- Adjacent to either a Science Laboratory or Application Studio
- Access to collaborator

**Furniture and Equipment Requirements**
- Fixed Furniture:

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**Area B: Flex Studio**

**Spatial Requirements**

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**Two corner cabinets with counter**
- Minimum of 2.14 ft² of base/slide counter space
- Counter height recommended to be 30” deep (24” minimum)
- **DELAWARE NEW TECH ACADEMY**
- **Area A: Integrated Studio**
- **Spatial Requirements**
- Number of units: 3 (1 of which is fully ADA accessible)
- Unit capacity: 50 Students, 2 Facilitators
- Unit area: 1,600 SF recommended
- **Activities**
  - Workshops
  - Group work
  - Project Work
- **Space Relationships**
  - Adjacent to either a Science Laboratory or Application Studio
  - Access to collaborator
- **Furniture and Equipment Requirements**
  - Fixed Furniture:
Concept Design
Charrette
Notice the Ed. Specs.
And Here
Resulting In
Which Led To
The Schematic Design Phase and Beyond
There is another component to our design process that isn't normally a part of standard design that we would like to talk with you about, and that is....
Well it looks ok from here.

PEER REVIEW
The Peers Were:

John Rigsbee, AIA
  • CSO Lead Architect

Rosemary Rehak, Ph.D.
  • CSO Ed. Planner

Mike Reed
  • CSO Principal
On the Engineering side....
Sustainable Design Elements
Combined Heating Cooling and Power

![Diagram of combined heating, cooling, and power system]

- Natural Gas Engine
- Variable Frequency AC
- To Exhaust After Treatment & Heat Recovery
- Rectifier
- DC
- Inverter
- Optional DC Input from Auxiliary Device (solar PV, Battery, Fuel Cell, etc.)
- High Quality 3-Phase, 50 or 60 Hz Power
- Permanent Magnet Generator
Condensing Boilers & Absorption Chillers

1 x New, 40-ton Cooling Tower, To Replace Existing, Decommissioned, Unit on Roof.

New Base-Mounted Pumps to Serve All Hydronic Loads.

Hydronic Lines to Tunnels.

2 x New, 40-ton absorption chillers

3 x New, High-Efficiency, Condensing Boilers

Hydronic Lines to Existing Chiller.

1 x New, 100kW Combined Heating / Power Inverter Generator
Chilled Beam HVAC
The Results
The Results

Your Ideas Revisited
Remember Our Group Exercise?
LEARNING SPACE MATTERS!

WHAT DID YOU COME UP WITH?
Here Is What New Tech Says
LEARNING SPACE MATTERS

- Visual transparency
- Large, open classrooms
- Wide corridors
- Mobile Furniture
- Casual gathering spaces
- Modern, professional (corporate) look
- No bells
Let's briefly review your thoughts and what New Tech advocates with what we've done in terms of design.